## What is claimed is:

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- A method of digitally canceling interference on a received signal 2 within a satellite payload comprising adaptively canceling interference on the 3 received signal using an interference reference feedforward signal. 4
- 2. 1 A method as in claim 1 further comprising subtracting an counterinterference signal from the received signal to form a desired signal. 2
  - A method as in claim 2 further comprising digitally processing said 3. desired signal to generate said feedforward interference reference signal.
- method as in claim 3 further comprising correlating said 1 4. interference reference feedforward signal to said desired signal to generate an error 2 signal. 3
- 5. 1 A method as in claim 4 wherein adaptively canceling interference on 2 the received signal further comprising generating said counter-interference signal based on said error signal to cancel said interference.
  - 6. A method as in claim 5 wherein adaptively canceling interference further comprises iteratively canceling interference on the received signal until said error signal equals zero.
- 7. A method as in claim 1 wherein said adaptively canceling interference further comprises digitally and accurately replicating the interference. 2

| 1   | 8. \ A method as in claim 1 further comprising simultaneously digitally            |
|-----|--|
| 2   | canceling interference on a plurality of received signals.                         |
| 1   | 9. A method as in claim 1 further comprising sequentially digitally                |
| 2 . | canceling interference on a plurality of received signals.                         |
| 1   | 10. A method of digitally canceling interference on a received signal              |
| 2   | within a satellite payload comprising:   |
| 3   | receiving a communication signal having interference;                              |
| 4   | converting said communication signal into the received signal;                     |
| 5   | subtracting a counter-interference signal from the received signal to form a       |
| 6   | desired signal;  |
| 7   | digitally processing said desired signal to form an interference reference         |
| 8   | feedforward signal;  |
| 9   | correlating said interference reference feedforward signal to said desired         |
| 10  | signal to generate an error signal; and  |
| 11  | adaptively canceling interference on the received signal based on said error       |
| 12  | signal by generating said counter-interference signal to cancel said interference. |
| 1   | A satellite communication system comprising:                                       |
| 2   | a first antenna for receiving a communication signal;                              |
| 3   | an analog-to-digital converter (ADC) electrically coupled to said first            |

antenna, said ADC converting said communication signal to a received signal;

|  | 7             | said satellite payload circuit digitally processing said received signal to          |
|--|---------------|--|
|  | 8             | form an interference reference feedforward signal; and                               |
|  | 9             | a feedforward signal path electrically coupling said output to said second           |
|  | 10            | input, said feedforward signal path transferring said interference reference         |
| _  | 11            | feedforward signal from said output to said second input.                            |
| 147<br>147   | <b>&gt;</b> 1 | 12. A system as in claim 11 wherein said satellite payload circuit further           |
| <i>]</i>   | 2             | comprises:   |
| II 2 P D II Nove B W United Was B II from an office B II from an o | 3             | a subtractor electrically coupled to said ADC, said subtractor subtracting a         |
|  | 4             | counter-interference signal from said received signal to form a desired signal;      |
|  | 5             | a digital processor electrically coupled to said subtractor, said digital            |
| =.=<br>= =<br>= =  | 6             | processor generating said interference reference feedforward signal from said        |
| = ±<br>= ±   | 7             | desired signal;  |
|  | 8             | a correlator electrically coupled to said subtractor, said correlator comparing      |
|  | 9             | said interference reference feedforward signal to said desired signal to generate an |
|  | 10            | error signal; and  |
|  | 11            | a controller electrically coupled to said correlator and said subtractor, said       |
|  | 12            | controller adaptively canceling interference on said received signal based on said   |

output, said first input is electrically coupled to said ADC;

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error signal.

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a satellite payload circuit comprising a first input, a second input, and an

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|   | 1  | 13. A communication system comprising:   |
|   | 2  | a first antenna for receiving a communication signal;                                |
|   | 3  | an analog-to-digital converter (ADC) electrically coupled to said first              |
|   | 4  | antenna, said ADC converting said communication signal to a received signal;         |
|   | 5  | a subfractor electrically coupled to said ADC, said subtractor subtracting a         |
|   | 6  | counter-interference signal from said received signal to form a desired signal;      |
| > | 7  | a digital processor electrically coupled to said subtractor, said digital            |
|   | 8  | processor generating said interference reference feedforward signal from said        |
|   | 9  | desired signal;  |
|   | 10 | a correlator electrically coupled to said subtractor, said correlator comparing      |
|   | 11 | said interference reference feedforward signal to said desired signal to generate an |
|   | 12 | error signal; and  |
|   | 13 | a controller electrically coupled to said correlator and said subtractor, said       |
|   | 14 | controller adaptively canceling interference on said received signal based on said   |
|   | 15 | error signal.  |
|   |    | 1  |